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None

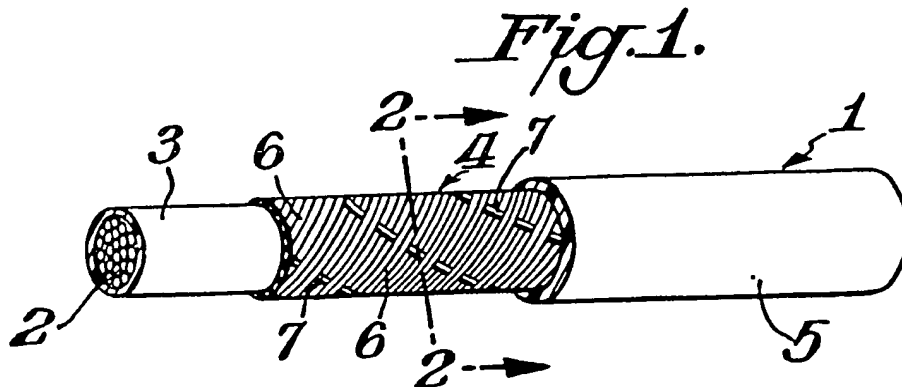
(58) Field of search

H1A

Selected US specifications from IPC sub-class H01B

(54) A flexible shielded coaxial cable

(57) A flexible shielded electrical coaxial cable has a shielding layer 4 surrounding a core 2, wherein the shielding layer comprises a plurality of metal wires 6 helically overwrapped about the core, adjacent turns being in contact with one another, and wherein at least one strip 7 is interwoven in a stitching manner among the wires 6 of the shielding layer. The strip is preferably of low friction plastics e.g. expanded polytetrafluoroethylene. The cable is highly flexible and useful in robots, for example. Optionally the core may comprise optical fibres.



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Fig. 1.

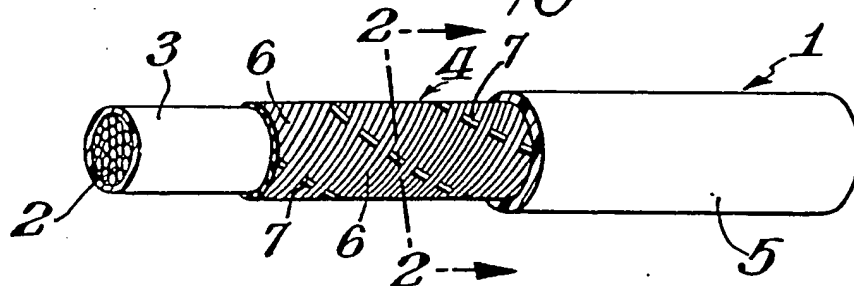
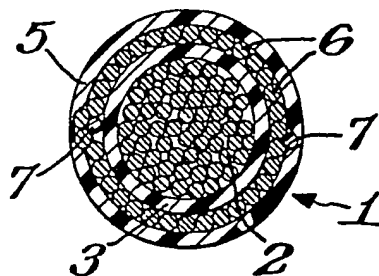


Fig. 2.



SPECIFICATION

A flexible shielded coaxial cable

5 The present invention relates to a flexible shielded electrical coaxial cable having a shielding layer surrounding a core line, the shielding layer comprising metal wires helically over-wrapped about the outer circumference of the
10 cable core, adjacent wires being in close contact with one another.

Electric cables of this kind are widely used in electronic devices and, more recently, have been moulded into coil shapes. As a result,
15 they are widely used for robots. Thus, it is desirable to have their flexing resistances and shielding capabilities maintained for extended periods of time.

Generally, the shielding layer of a shielded
20 electric cable has heretofore used either a tape of metal foil such as aluminum foil or a braided or closed conductor, as disclosed in Japanese Patent Laid-Open Publication No. 59-325,608.

25 However, such a shielded electric cable using metal foil tape or the braided conductor as the shielding layer has certain disadvantages. In a case where it is repeatedly bent, the metal foil or braided conductor can be damaged causing the electric cable not only to
30 lose its shielding capacity but also to possibly short or cut its internal core line. Although the closed conductor shielding layer initially is too flexible to directly cause the damage or the
35 short, the shielding conductor wires may be offset, as the bending action continues, thereby losing the shielding capability.

There is therefore a need for a flexible shielded cable which is so flexible that it will not
40 lose its shielding capability as it is repeatedly bent.

According to the present invention there is provided a flexible shielded electrical coaxial cable having a shielding layer surrounding a
45 core line, wherein said shielding layer comprises a plurality of metal wires helically over-wrapped about said core line, adjacent turns being in close contact with one another, and comprising at least one strip interwoven in a
50 stitching manner among said metal wires of said shielding layer.

The interwoven strip is preferably a strip of a low friction plastics material. The strip can be of an elastomeric material or a strip of
55 porous, expanded polytetrafluoroethylene.

The invention will now be particularly described, by way of example, with reference to the accompanying drawings in which:-

60 *Figure 1* is a perspective view, partly in cross-section, of an end portion of a flexible shielded cable according to one embodiment of the present invention, and

Figure 2 is a cross-sectional view of the cable taken along line 2-2 of Fig. 1.

65 The flexible shielded cable of the present

invention is constructed to include a shielding layer having a plurality of metal wires helically arranged in a closed manner on the outer circumference of a core line, and has at least
70 one strip interwoven in a stitching manner among the metal wires of the shielding layer.

If the interwoven strip used in the construction is made of an extendible and contractible member such as an elastomer or a low friction material such as a fluorocarbon resin, it
75 can advantageously hold the closed metal wires evenly without substantially lessening the flexibility of the electric wire or cable.

If such holding strips are arranged such that
80 they are interleaved and interwoven in a stitching manner into the metal wires, the wires being arranged in the closed contact manner, the construction substantially eliminates offset and unevenness of the metal
85 wires after the flexible shielded cable has been repeatedly bent.

In the illustrated embodiment, the flexible shielded cable 1 has a core line 2 composed for a plurality of insulated electric lines. The
90 outer circumference of the core line is sheathed by a protective plastic insulator 3 and this is enclosed within a shielding layer 4 which in turn is sheathed with a resin sheath 5.

The shielding layer 4 comprises a plurality of metal wires 6 helically overwrapped over insulation 3, adjacent wires being in close contact. Holding strips 7 are interwoven with the metal wires 6 are shown. These holding
100 strips 7 are preferably arranged to be helically stitched into every three or twenty metal wires 6, for example.

As a result, the metal wires 6 arranged on the outer circumference of the core line insulation 3 are held uniformly in a form of chord fabric.

This substantially prevents the shielding layer 4 from having its metal wires 6 offset, even if the cable is bent or exposed to a
110 twisting force, so that it holds its uniform shielding capacity.

If the holding strips 7 used in the shielding layer 4 are made of expanded and sintered polytetrafluoroethylene having low friction characteristics, they will not substantially lessen the flexibility of the cable. Even if the
115 holding strips 7 are made of an extendible and contractible materials such as an elastomer, the flexibility of the shielded cable 1 can be maintained at a satisfactory level.

The present invention can be modified in various manners. For example, a plurality of shielding layers can be provided, overlapped or separated to enhance the shielding capacity. Again the core line can comprise optical
125 fiber wires and the holding strips can be made of arbitrary threads.

By means of the present invention, it is possible to provide a shielded cable which has
130 excellent flexibility and whose shielding capa-

city does not decrease substantially even after it has been repeatedly bent.

CLAIMS

- 5 1. A flexible shielded electrical coaxial cable having a shielding layer surrounding a core line, wherein said shielding layer comprises a plurality of metal wires helically over-wrapped about said core line, adjacent turns
- 10 being in close contact with one another, and comprising at least one strip interwoven in a stitching manner among said metal wires of said shielding layer.
- 15 2. A cable according to claim 1 wherein said strip is a strip of a low friction plastics material.
3. A cable according to claim 1 wherein said strip is a strip of an elastomeric material.
- 20 4. A cable according to claim 1 wherein said strip is a strip of porous, expanded polytetrafluoroethylene.
5. A flexible shielded electrical coaxial cable substantially as herein described with reference to the accompanying drawings.

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